

## Non-Confidential Description - PSU No. 3210 "Computerized Estimation of Image Quality and Attractiveness"

### Keywords:

Image retrieval; photo aesthetics; digital libraries

### Links:

[Inventor website - 1](#) : [Inventor website - 2](#)

[US Patent 8,755,596](#)

[US Patent 8,995,725](#)

[US Patent 8,781,175](#)

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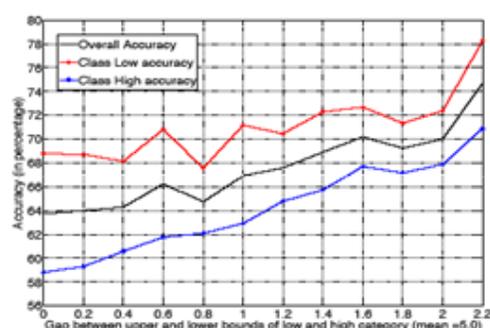


Figure 1: Accuracy Plot

### Background

There is a clear need for automatic systems that can help shoot aesthetically pleasing pictures, choose among a set of pictures those that are most visually appealing, and/or help in aesthetically agreeable design of posters and packaging. The major difficulty in addressing this need is that judging beauty and other aesthetic qualities of photographs is a highly subjective task and there are no unanimously agreed upon standards for measuring aesthetic value. It is no surprise then that (to the best of our knowledge) there exists no computational system to automatically predict the visual/aesthetic quality of photographs.

### Invention Description

In spite of the ambiguous definition of aesthetics, we have shown that there exist certain visual properties which make photographs, in general, more aesthetically pleasing. We treated the challenge of automatically inferring aesthetic quality of pictures using their visual content as a machine learning problem; with a peer-rated online photo sharing website as data source. We extracted certain visual features based on the intuition that they can discriminate between aesthetically pleasing and displeasing images. These features include a number relevant to photographic quality such as a low depth-of-field indicator, a colorfulness measure, a shape convexity score and a familiarity measure. Automated classifiers were built using support vector machines and classification trees. Linear regression on polynomial terms of the features was also applied to infer numerical aesthetics ratings which we have shown correlates very well with human ratings. The resulting system has shown a 70-80% agreement with public ratings. Figure 1 shows the accuracy of the system compared to human ratings for 3581 photographs.

The invention can help assist in photography and visual design in an automated manner, reducing the need for service of humans. Potential applications include content-based image retrieval and digital photography. Casting all of these components together we have an integrated system or OSCAR, (On-Site Composition and Aesthetics feedback through exemplars) where the system can be ported on a device or can act as a remote sensor that can be accessed through 3G or 4G networks.

### Advantages/Applications

- Automatically provide aesthetic ratings for many images easily
- Correlates very well with public human ratings

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- Numerous software, online, and hardware applications

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